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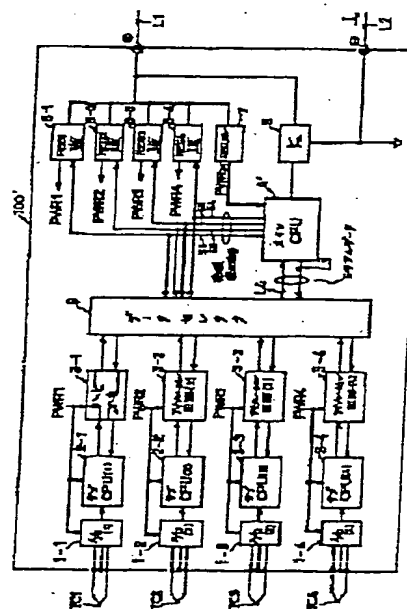
(54) MULTI-POINT INPUTTING TWO-WIRE TRANSMITTER

(57) Abstract

PURPOSE: To attain multi-point measurement for temperature or the like by eliminating the necessity of a power supply of large capacity for a master device and connecting only one two-wire transmission line between the master device and this multi-point inputting two-wire transmitter.

CONSTITUTION: The transmitter is provided with a main power supply generating circuit 7 and local power supply generating circuits 8-1 to 8-4. The circuits 7, 8-1 to 8-4 receive current supply from the transmission line L1 and respectively generate main power supply PWRM and local power supplies PWR1 to PWR4. The main power supply PWRM is always supplied to a main CPU 4'. The local power supplies PWR1 to PWR4 are successively supplied to A/D conversion circuits 1-1 to 1-4, sub-CPU's 2-1 to 2-4 and isolation circuits 3-1 to 3-4.

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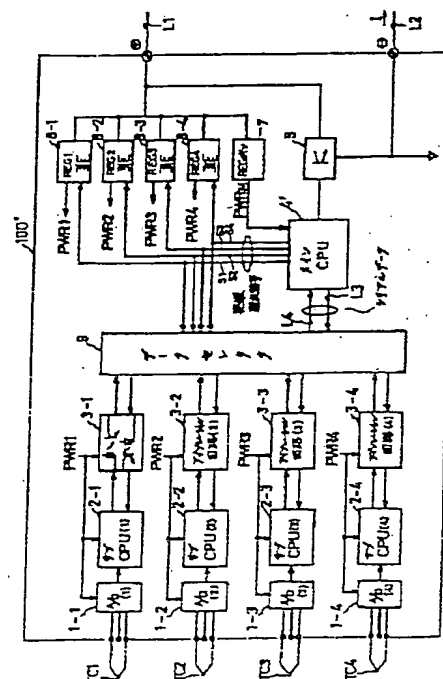
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(54) 【発明の名称】 多点入力2線式伝送器

(57) 【要約】

【目的】 上位装置において大容量の電源を必要とすることなく、また上位装置との間に2線の伝送路を一つ敷設するのみで、温度等の多点測定を可能とする。

【構成】 メイン電源生成回路7およびローカル電源生成回路8-1~8-4を設ける。メイン電源生成回路7およびローカル電源生成回路8-1~8-4は、伝送路L1からの電流の供給を受けて、メイン電源PWR、およびローカル電源PWR1~PWR4を生成する。メイン電源PWRはメインCPU4'へ常時供給する。ローカル電源PWR1~PWR4は、ローカル電源生成回路8-1~8-4を順次切り替えて作動させることにより、A/D変換回路1-1~1-4、サブCPU2-1~2-4、アイソレーション回路3-1~3-4へ順次に供給する。



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【特許請求の範囲】

【請求項1】 第1～第Nのセンサからの検出信号をデジタル信号に変換する第1～第NのA/D変換手段と、

この第1～第NのA/D変換手段の変換したデジタル信号を入力とし送信データを生成する第1～第Nのサブ演算処理手段と、

この第1～第Nのサブ演算処理手段の生成する送信データに対しての返送要求およびこの返送要求に応じて返送される送信データをアイソレーションして伝送する第1～第Nのアイソレーション手段と、

2線の伝送路からの電流の供給を受けてメイン電源を生成するメイン電源生成手段およびローカル電源を生成する第1～第Nのローカル電源生成手段と、

前記メイン電源生成手段の生成するメイン電源の供給を受けて、前記第1～第Nのローカル電源生成手段を順次に切り替えて作動させ、この第1～第Nのローカル電源生成手段の生成するローカル電源を前記第1～第NのA/D変換手段、サブ演算処理手段およびアイソレーション手段へ供給すると共に、ローカル電源の供給されるサブ演算処理手段へそのサブ演算処理手段の生成する送信データに対しての返送要求を送り、この返送要求に応じて返送されてくる送信データを受信し、この受信した送信データを前記伝送路に流れる電流の変化として上位装置へ送るメイン演算処理手段とを備えたことを特徴とする多点入力2線式伝送器。

【発明の詳細な説明】

【0001】

【産業上の利用分野】 この発明は、温度センサ等のセンサからの検出信号を入力とし、この検出信号をデジタル信号に変換して送信データを生成し、この送信データを電源の供給通路を兼ねる2線の伝送路を介して上位装置へ送る2線式伝送器に関するものである。

【0002】

【従来の技術】 従来、この種の2線式伝送器は、図2に示すように、A/D変換回路1と、サブCPU2と、アイソレーション回路3と、メインCPU4と、ドライバ回路5と、電源生成回路(REG)6とを備えている。

【0003】 この2線式伝送器において、電源生成回路6は、2線の伝送路L1からの電流(4mA)の供給を受けて電源を生成し、その電源をA/D変換回路1、サブCPU2、アイソレーション回路3、メインCPU4へ供給する。電源の供給を受けたA/D変換回路1は、熱電対や測温抵抗体等の温度センサTCからの検出信号をデジタル信号に変換する。A/D変換回路1により変換されたデジタル信号はサブCPU2へ与えられる。サブCPU2は、入力されるデジタル信号より、送信データを生成する。この送信データは、メインCPU4からの返送要求に応じて、メインCPU4へ送られる。

【0004】 この際、メインCPU4からの返送要求およびサブCPU2からの送信データは、アイソレーション回路3においてアイソレーションされたうえ、サブCPU2およびメインCPU4へ送られる。この例では、アイソレーション回路4として、フォトカプラが用いられている。サブCPU2からの送信データを受信すると、メインCPU4は、ドライバ回路5を駆動し、その受信した送信データを2線の伝送路L2に流れる電流Iの変化として上位装置へ送る。この場合、測定レンジの0～100%に対し、電流Iは4～20mAの変化として現れる。

【0005】

【発明が解決しようとする課題】 しかしながら、このような従来の2線式伝送器100によると、一点の温度しか測定できない。すなわち、一点の測定データを上位装置へ伝送することしかできない。このため、多点の温度を測定し、その測定データを上位装置へ伝送したい場合には、2線式伝送器100を多数設け、これら2線式伝送器100と上位装置との間に伝送路L1、L2を各個に敷設しなければならず、ケーブルの敷設数の増大および敷設工数の増大によりコストがかかり、不経済であるという問題があった。また、このようにすると、各2線式伝送器100においてその動作電力として最低でも4mAの電力が消費されるため、すなわち4mA×2線式伝送器100の数だけの電力が最低でも必要となるため、上位装置において大容量の電源を必要とするという問題が生ずるものであった。

【0006】 本発明はこのような課題を解決するためになされたもので、その目的とするところは、上位装置において大容量の電源を必要とせず、また上位装置との間に2線の伝送路を一つ敷設するのみで多点の測定データを上位装置へ伝送することのできる多点入力2線式伝送器を提供することにある。

【0007】

【課題を解決するための手段】 このような目的を達成するために、本発明は、第1～第Nのセンサからの検出信号をデジタル信号に変換する第1～第NのA/D変換手段と、この第1～第NのA/D変換手段の変換したデジタル信号を入力とし送信データを生成する第1～第Nのサブ演算処理手段と、この第1～第Nのサブ演算処理手段の生成する送信データに対しての返送要求およびこの返送要求に応じて返送される送信データをアイソレーションして伝送する第1～第Nのアイソレーション手段と、2線の伝送路からの電流の供給を受けてメイン電源を生成するメイン電源生成手段およびローカル電源を生成する第1～第Nのローカル電源生成手段と、メイン電源生成手段の生成するメイン電源の供給を受けて、第1～第Nのローカル電源生成手段を順次に切り替えて作動させ、この第1～第Nのローカル電源生成手段の生成するローカル電源を第1～第NのA/D変換手段、サブ

演算処理手段およびアイソレーション手段へ供給すると共に、ローカル電源の供給されるサブ演算処理手段へそのサブ演算処理手段の生成する送信データに対しての返送要求を送り、この返送要求に応じて返送されてくる送信データを受信し、この受信した送信データを伝送路に流れる電流の変化として上位装置へ送るメイン演算処理手段とを備えたものである。

【0008】

【作用】したがってこの発明によれば、2線の伝送路からの電流の供給を受けて、メイン電源生成手段がメイン電源を生成する。このメイン電源の供給を受けて、メイン演算処理手段は、第1～第Nのローカル電源生成手段を順次に切り替えて作動させる。第1～第Nのローカル電源生成手段の生成するローカル電源（伝送路からの電流の供給を受けて生成されるローカル電源）は、第1～第NのA/D変換手段、サブ演算処理手段およびアイソレーション手段へ供給される。例えば、第1のローカル電源生成手段が作動した場合には、この第1のローカル電源生成手段の生成するローカル電源が、第1のA/D変換手段、第1のサブ演算処理手段および第1のアイソレーション手段へ供給される。また、メイン演算処理手段は、ローカル電源の供給されるサブ演算処理手段へ、そのサブ演算処理手段の生成する送信データに対しての返送要求を送り、この返送要求に応じて返送されてくる送信データを受信し、この受信した送信データを伝送路に流れる電流の変化として上位装置へ送る。例えば、ローカル電源の供給されるサブ演算処理手段が第1のサブ演算処理手段であれば、第1のサブ演算処理手段へ第1のアイソレーション手段を介して返送要求を送り、この返送要求に応じて第1のアイソレーション手段を介して返送されてくる第1のサブ演算処理手段からの送信データを受信し、この受信した送信データを伝送路に流れる電流の変化として上位装置へ送る。

【0009】

【実施例】以下、本発明を実施例に基づき詳細に説明する。図1はこの発明の一実施例を示す多点入力2線式伝送器のブロック回路構成図である。同図において、1-1～1-4は第1～第4のA/D変換回路、2-1～2-4は第1～第4のサブCPU、3-1～3-4は第1～第4のアイソレーション回路、4'はメインCPU、5はドライバ回路、7はメイン電源生成回路（REGメイン）、8-1～8-4はローカル電源生成回路（REG1～REG4）、9はデータセクタである。

【0010】この多点入力2線式伝送器100'において、メイン電源生成回路7は、伝送路L1からの電流の供給を受けてメイン電源PWR_Mを生成し、メインCPU4'へ与える。メインCPU4'は、このメイン電源PWR_Mの供給を受けて、予め定められているプログラムに従って動作する。まず、メインCPU4'は、発振選択信号S1をローカル電源生成回路8-1へ送る。こ

れにより、ローカル電源生成回路8-1が作動し、伝送路L1からの電流の供給を受けてローカル電源PWR1を生成し、A/D変換回路1-1、サブCPU2-1、アイソレーション回路3-1へ供給する。ローカル電源PWR1の供給を受けて、A/D変換回路1-1は、温度センサTC1からの検出信号をデジタル信号に変換し、サブCPU2-1へ送る。サブCPU2-1は、入力されるデジタル信号より、送信データを生成する。

【0011】一方、メインCPU4'は、発振選択信号S1をデータセクタ9へも送る。この発振選択信号S1を受けて、データセクタ9は、メインCPU4'からのラインL3を介する返送要求（シリアルデータ）をアイソレーション回路3-1を介してサブCPU2-1へ送る。サブCPU2-1は、メインCPU4'からの返送要求に応じて、送信データ（シリアルデータ）をアイソレーション回路3-1およびデータセクタ9を介しラインL4を通してメインCPU4'へ送る。メインCPU4'は、ドライバ回路5を駆動し、その受信したサブCPU2-1からの送信データを伝送路L2に流れる電流Iの変化として上位装置へ送る。

【0012】次に、メインCPU4'は、発振選択信号S2をローカル電源生成回路8-2へ送る。これにより、ローカル電源生成回路8-1に替わってローカル電源生成回路8-2が作動する。ローカル電源生成回路8-2は、伝送路L1からの電流の供給を受けてローカル電源PWR2を生成し、A/D変換回路1-2、サブCPU2-2、アイソレーション回路3-2へ供給する。ローカル電源PWR2の供給を受けて、A/D変換回路1-2は、温度センサTC2からの検出信号をデジタル信号に変換し、サブCPU2-2へ送る。サブCPU2-2は、入力されるデジタル信号より、送信データを生成する。

【0013】一方、メインCPU4'は、発振選択信号S2をデータセクタ9へも送る。この発振選択信号S2を受けて、データセクタ9は、メインCPU4'からのラインL3を介する返送要求をアイソレーション回路3-2を介してサブCPU2-2へ送る。サブCPU2-2は、メインCPU4'からの返送要求に応じて、送信データをアイソレーション回路3-2およびデータセクタ9を介しラインL4を通してメインCPU4'へ送る。メインCPU4'は、ドライバ回路5を駆動し、その受信したサブCPU2-2からの送信データを伝送路L2に流れる電流Iの変化として上位装置へ送る。

【0014】以下、同様に、メインCPU4'は、発振選択信号S3、S4をローカル電源生成回路8-3、8-4へ順次に送り、ローカル電源生成回路8-3、8-4を順次に切り替えて作動させ、これにより順次に生成されるローカル電源PWR3、PWR4をA/D変換回路1-3、1-4、サブCPU2-3、2-

4、アイソレーション回路3-3、3-4へ供給し、サブCPU2-3、2-4からの送信データを伝送路L2に流れる電流Iの変化として順次に上位装置へ送る。そして、サブCPU2-4からの送信データを上位装置へ送った後は、発振選択信号S1をローカル電源生成回路8-1へ送り、上述した動作を繰り返す。

【0015】以上の説明から分かるように、本実施例による多点入力2線式伝送器100'によれば、常時生成されるメイン電源PWR₁と順次切り替わって生成されるローカル電源PWR1~PWR4とが使用されるので、その作動電力としては1点入力の場合と同じ4mAの電流で間に合い、上位装置において大容量の電源を必要としないものとなる。また、本実施例によれば、上位装置との間に2線の伝送路L1、L2を一つ敷設するのみで4点の測定データを上位装置へ送ることができ、ケーブルの敷設数の増大および敷設工数の増大によりコストがかかるという問題が生じず、非常に経済的となる。

【0016】なお、本実施例においては、TC1~TC4を温度センサとしたが、湿度センサ等を接続するものとしてもよい。また、本実施例において、温度センサTC1~TC4を測温抵抗体とした場合には、測温抵抗体に電流を流さなければならないので測定に際しての立ち上がり時間がある程度必要とするが、これに対しては発振選択信号S1~S4の切替周期を長くすることによって対応することができる。温度センサTC1~TC4を熱電対とした場合には、検出信号が起電力として即座に得られるので、発振選択信号S1~S4の切替周期は短くてもよい。

【0017】

【発明の効果】以上説明したことから明らかなように本発明によれば、常時生成されるメイン電源と順次切り替わって生成されるローカル電源とが使用されるので、その作動電力としては1点入力の場合と同じ電力で間に合い、上位装置において大容量の電源を必要としないものとなる。また、上位装置との間に2線の伝送路を一つ敷設するのみで多点の測定データを上位装置へ送ることができ、ケーブルの敷設数の増大および敷設工数の増大によりコストがかかるという問題が生じず、非常に経済的となる。

【図面の簡単な説明】

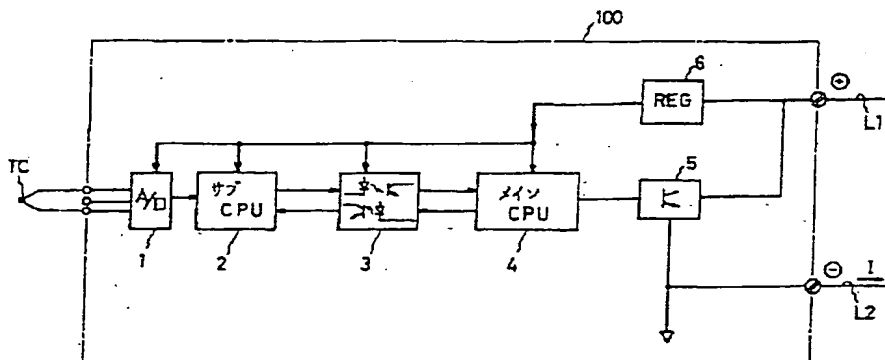
【図1】本発明の一実施例を示す多点入力2線式伝送器のブロック回路構成図である。

【図2】従来の2線式伝送器のブロック回路構成図である。

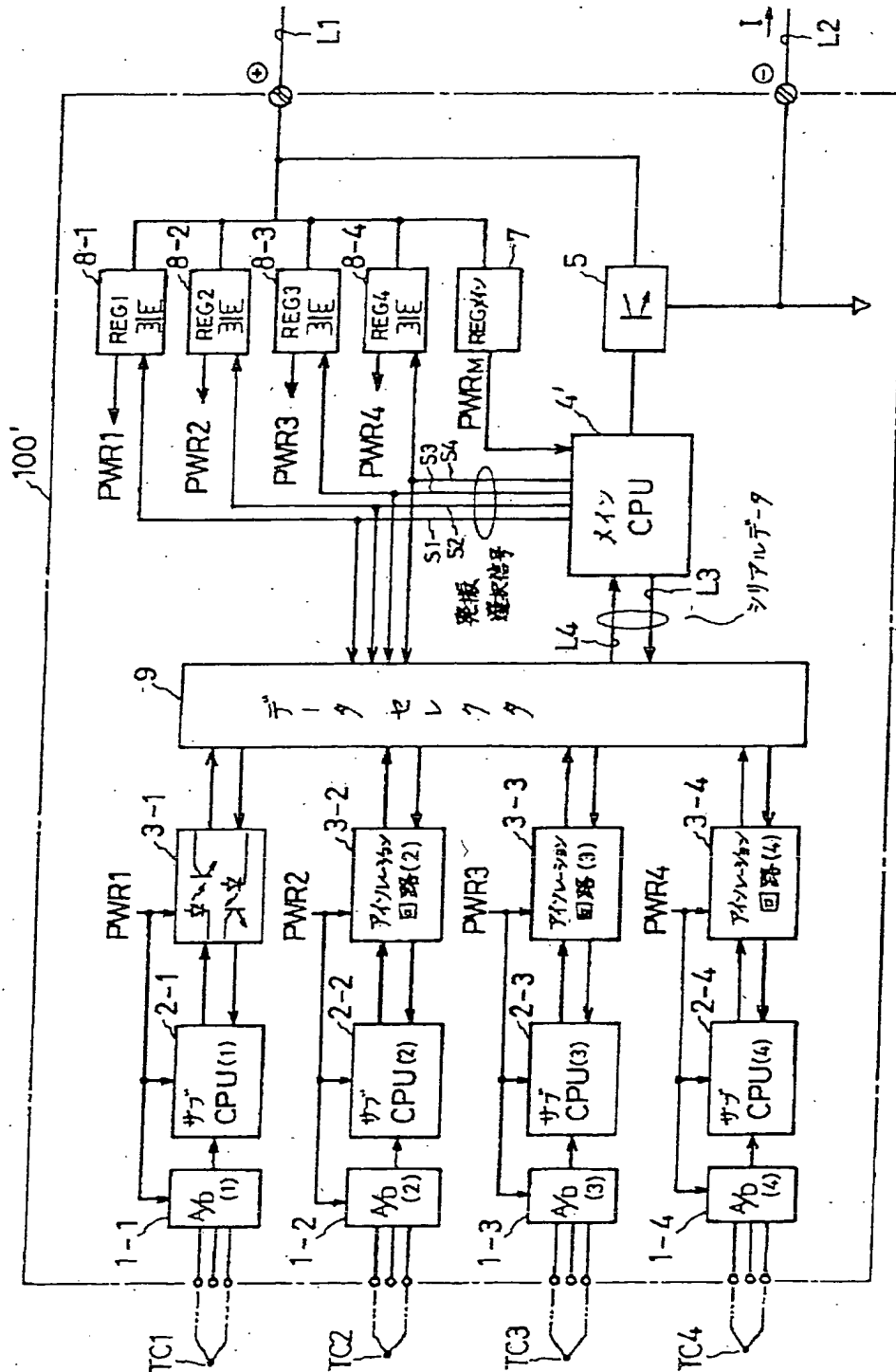
【符号の説明】

- 1-1~1-4 A/D変換回路
- 2-1~2-4 サブCPU
- 3-1~3-4 アイソレーション回路
- 4' メインCPU
- 5 ドライバ回路
- 7 メイン電源生成回路
- 8-1~8-4 ローカル電源生成回路
- 9 データセクタ
- TC1~TC4 温度センサ
- L1, L2 伝送路
- 100' 多点入力2線式伝送器

【図2】



【図1】



Two-wire Multiple Input Transmitter

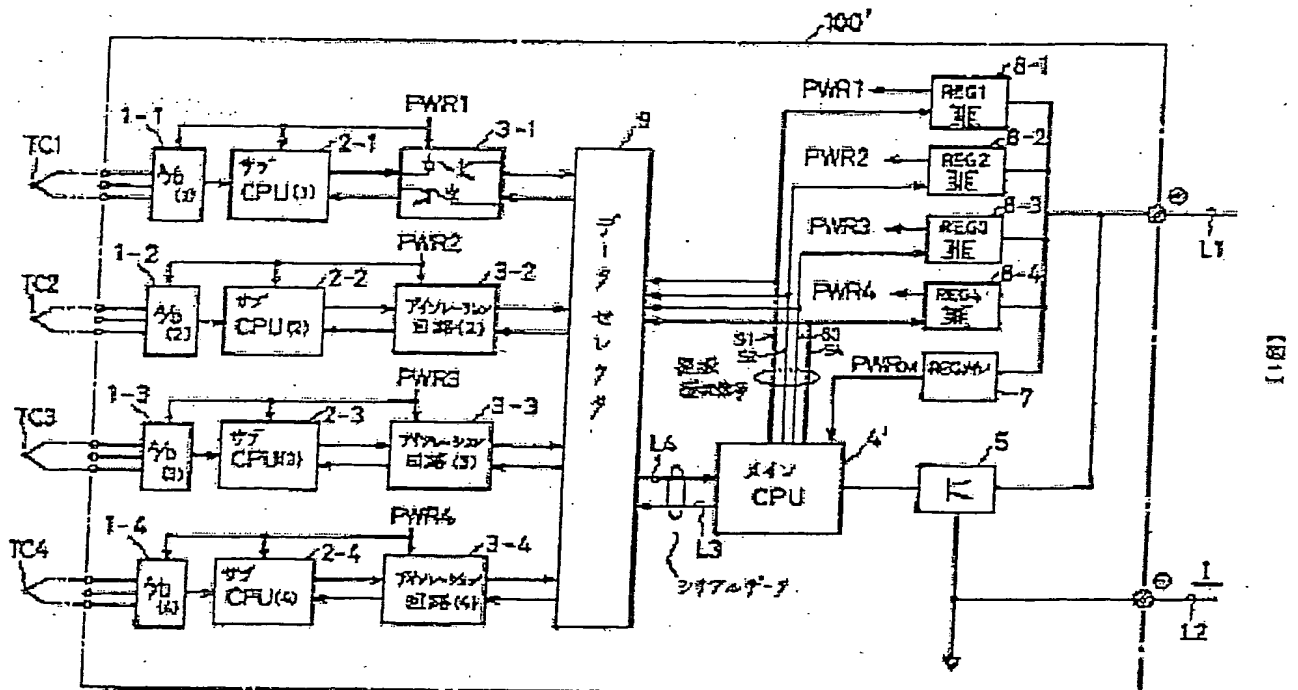
Patent No. : JP3077076

Applicant: Yamatake

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Date of patent: Aug. 14, 2000



- 1-1, ..., 1-4 A/D converters
- 2-1, ..., 2-4 Sub processing means (Sub CPU)
- 3-1, ..., 3-4 Isolation circuit
- 4 Main processing means (Main CPU)
- 5 Driver circuit
- 7 Main power supply circuit
- 8-1,...,8-4 Local power supply circuit
- 9 Data selector
- TC1,...,TC4 Temperature sensor
- L1, L2 transmission line (=two-wire loop)
- 100' two-wire multiple input transmitter

Claim

A Two-wire multiple input transmitter comprising:

A/D converters means 1- n converting detected signals by sensors 1- n into digital signals;

Sub processing means 1- n generating transmission-data from said digital signals converted by the

A/D converter means;

Isolation circuit means 1-n transmitting a request data to send and a transmission data corresponded in response to the request data to send in isolation;

A main power supply circuit means generating a main power supply with power received from two-wire line;

Local power supply circuits means 1- n generating local power supplies ;

A main processing means supplied by said main power supply circuit means, and the main processing means sequentially selecting and activating said local power supply circuits 1 - n, and supplying said A/D converters means 1- n and said sub processing means and said isolation circuit means, the main processing means transmitting the request data to send into the sub processing means, and receiving the transmission data in response to the request data to send, and transmitting the received data into a upper equipment through two-wire line by means of alternated current signal.

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1995

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Convention Priority Claim: none

Applicant: Yamatake-Honeywell K.K., Tokyo, Japan

Title: Two-wire multiple input transmitter

[ABSTRACT]

(PURPOSE) To make it possible to execute the multiple point measurement of temperature or the like by providing only one two-wire transmission line between this two-wire multiple input transmitter and the host device without the necessity of providing a large-capacity power supply in the host device.

(CONSTITUTION) A main power supply generation circuit 7 and local power supply generation circuits 8-1 to 8-4 are provided. The main power supply generation circuit 7 and the local power supply generation circuits 8-1 to 8-4 receive current supply from a transmission line L1 and generate a main power supply PWR_M and local power supplies $PWR1$ to $PWR4$. The main power supply PWR_M always supplied to a main CPU 4'. The local power supplies $PWR1$ to $PWR4$

are successively supplied to A/D conversion circuits 1-1 to 1-4, sub CPUs 2-1 to 2-4 and isolation circuits 3-1 to 3-4 by actuating the local power supply generation circuits 8-1 to 8-4 successively by switching.

CLAIM:

A two-wire multiple input transmitter comprising
1st to Nth A/D converter means for converting the
detected signals from 1st to Nth sensors,

1st to Nth sub-processing means for receiving as inputs
the digital signals converted by said 1st to Nth A/D
converter means and generating transmission data,

1st to Nth isolation means for transmitting, by
isolation, a request for return of the transmission data
generated by said 1st to Nth sub-processing means and the
transmission data returned in response to this request for
return,

1st to Nth local power supply generation means that is
fed with the current from the two-wire transmission line
and generates a main power supply,

a main power supply generating means that receives the
supply of current from a two-wire transmission line and 1st
to Nth local power supply generating means that generate
local power supplies, and

a main processing means that receives the main power supply generated by said main power supply generating means to thereby actuate said 1st to Nth local power supply generating means successively by switching, feed the local power supplies generated by said 1st to Nth local power supply generating means to said 1st to Nth A/D converter means, said sub processing means and said isolation means, and further, a return request for return of the transmission data generated by said sub processing means, receive the transmission data returned in response to this request for return, and send, to a host device, the thus received transmission data as a change in the current flowing through said transmission line.

DETAILED DESCRIPTION OF THE INVENTION:

[0001]

(Industrial Field of Utilization)

The present invention relates to a two-wire transmitter that receives as input the detected signal from a sensor such as a temperature sensor or the like, converts this detected signal into a digital signal to generate transmission data and sends this transmission data to a host device through a two-wire transmission line serving also as a power supply feed line.

[0002]

(Prior Art)

A conventional two-wire transmitter of this type comprises an A/D conversion circuit 1, a sub CPU 2, an isolation circuit 3, a main CPU 4, a driver circuit 5, and a power supply generation circuit (REG) 6.

[0003]

In this two-wire transmitter, the power supply generation circuit 6 is fed with a current (4 mA) from a two-wire transmission line L1 to generate a power supply and feeds this power supply to the A/D conversion circuit 1, the sub CPU 2, the isolation circuit 3, and the main CPU 4. The A/D conversion circuit 1, which has thus received the power supply, converts into a digital signal the detected signal from a temperature sensor TC such as a thermocouple, a temperature measuring resistor or the like. The digital signal thus converted by the A/D conversion circuit 1 is fed to the sub CPU 2. The sub CPU 2 generates transmission data from the thus received digital signal. This transmission data is sent to the main CPU 4 in response to the return request from the main CPU 4.

[0004]

In this case, the return request from the main CPU 4 and the transmission data from the sub CPU 2 are isolated

and then sent to the sub CPU 2 and the main CPU 4. In this example, a photo-coupler is used as the isolation circuit 4. Upon reception of the transmission data from the sub CPU 2, the main CPU 4 drives a driver circuit 5 to send to a host device the thus received transmission data as a change of the current I flowing through a two-wire transmission line L2. In this case, the current I appears as a change of 4 to 20 mA with respect to the measuring range of 0 to 100%.

[0005]

{Problem that the Invention is to solve}

However, by the use of such a conventional two-wire transmitter 100, the temperature only at one point can be measured. In other words, only the measured data at one point can be transmitted to the host device. Due to this, in the case of measuring the temperatures at multiple points and transmitting the thus measured data to the host device, it is necessary to provide a number of two-wire transmitters 100 and lay down transmission line L1, L2 individually between the respective two-wire transmitters 100 and the host device; and thus, the construction costs are increased due to an increase in number of the cables laid down and an increase in number of the construction steps for laying them down. It is a problematic matter

economically. Further, in this case, an electrical power of, at least 4 mA is consumed as the electrical power necessary for the operation of each two-wire transmitter 100; in other words, at least an electrical power equal to 4 mA x the number of two-wire type transmitters 100 is required, and thus, the problem has arisen that a large-capacity power supply is required in the host device.

[0006]

The present invention has been made in order to give a solution to such a problem, and it is the object of the invention to provide a two-wire multiple input transmitter constituted in such a manner that, in the host device, the provision of a large-capacity power supply is not necessary, and, by laying down only one two-wire transmission line between the transmitter and the host device, the measured data at multiple points can be transmitted to the host device.

[0007]

(Means for the Solution of the Problem)

In order to achieve this object, the present invention is comprised of 1st to Nth A/D converter means for converting the detected signals from 1st to Nth sensors; 1st to Nth sub-processing means for receiving as inputs the digital signals converted by said 1st to Nth A/D converter.

means and generating transmission data; 1st to nth isolation means for transmitting, by isolation, a request for return of the transmission data generated by said 1st to Nth sub-processing means and the transmission data returned in response to this request for return; 1st to Nth local power supply generating means that is fed with the current from the two-wire transmission line and generates a main power supply; a main power supply generating means that receives the supply of current from a two-wire transmission line and 1st to Nth local power supply generating means that generate local power supplies; and a main processing means that receives the main power supply generated by said main power supply generating means to thereby actuate said 1st to Nth local power supply generating means successively by switching, feed the local power supplies generated by said 1st to Nth local power supply generating means to said 1st to Nth A/D converter means, said sub processing means and said isolation means, and further, a return request for return of the transmission data generated by said sub processing means, receive the transmission data returned in response to this request for return, and send, to a host device, the thus received transmission data as a change in the current flowing through said transmission line.

[0008]

(Working)

Therefore, according to the present invention, the main power supply generating means receives current supply from the two-wire transmission line and generates a main power supply. Upon receipt of said main power supply, the main processing means actuates the 1st to Nth local power supply generating means successively by switching. The local power supplies generated by the 1st to Nth local power supply generating means (the local power supplies generated upon receipt of the current feed from the transmission line) are fed to the 1st to Nth A/D conversion means, the sub-processing means and the isolation means. In case the 1st local power supply generating means, for example, is actuated, the local power supply generated by this 1st local power supply generating means is fed to the 1st A/D conversion means, the 1st sub-processing means and the 1st isolation means. Further, the main processing means sends, to the sub-processing means to which the local power supply is fed, a request for return of the transmission data generated by said sub-processing means, receives the transmission data returned in response to said request for return, and sends to the host device the thus received transmission data as a change in the current flowing

through the transmission line. For example, if the sub-processing means to which the local power supply is fed is the 1st sub-processing means, then the main processing means sends a request of return to the 1st sub-processing means through the 1st isolation means, receives the transmission data returned through the 1st isolation means from the 1st sub-processing means in response to said request for return, and sends to the host device the thus received transmission data as a change in the current flowing through the transmission line.

[EMBODIMENT]

The present invention will now be described in more detail on the basis of an embodiment of the invention. Fig. 1 is a block circuit diagram showing the two-wire multiple input transmitter according to an embodiment of the present invention. Referring to Fig. 1, the reference numerals 1-1 to 1-4 designate 1st to 4th A/D converters, numerals 2-1 to 2-4 designate 1st to 4th sub CPUs, numerals 3-1 to 3-4 designate 1st to 4th isolation circuits, reference symbol 4' designates a main CPU, numeral 5 designates a driver circuit, numeral 7 designates a main power supply generation circuit (REG main), numerals 8-1 to 8-4 designate local power supply generation circuits (REG1

to REG4), and numeral 9 designates a data selector.

[0010]

In the thus constituted two-wire multiple input transmitter 100', the main power supply generation circuit 7 receives the current fed through the transmission line L1 to generate a main power supply PWR_M and applies it to the main CPU 4'. Upon reception of this main power supply PWR_M , the main CPU 4' operates in accordance with a previously determined program. First, the main CPU 4' sends an oscillation selecting signal S1 to the local power supply generation circuit 8-1, whereby the local power supply generation circuit 8-1 is actuated, so that, by receiving the current feed from the transmission line L1 to generate a local power supply PWR_1 and feeds it to the A/D conversion circuit 1-1, the sub CPU 2-1 and the isolation circuit 3-1. The A/D conversion circuit 1-1, which has thus been fed with the local power supply PWR_1 , converts the detected signal from a temperature sensor TC1 into a digital signal and sends this digital signal to the sub CPU 2-1. The sub CPU 2-1 produces transmission data from the digital signal thus inputted thereto.

[0011]

On the other hand, the main CPU 4' sends the oscillation selecting signal S1 to the data selector 9.

The data selector 9, which has thus received said oscillation selecting signal S1, sends a request of return (serial data) through a line L3 from the main CPU 4', to the CPU 2-1 through the isolation circuit 3-1. In response to the request for return from the main CPU 4', the sub CPU 2-1 sends the transmission data (serial data) to the main CPU 4' through the isolation circuit 3-1 and the data selector 9 and through a line L4. The main CPU 4' drives the driver circuit 5 to thereby send to the host device the thus received transmission data (sent) from the sub CPU 2-1, as a change in the current I flowing through the transmission line L2.

[0012]

Next, the main CPU 4' sends an oscillation selecting signal S2 to the local power supply generation circuit 8-2. As a result, the local power supply generation circuit 8-2 is actuated in place of the local power supply generation circuit 8-1. The local power supply generation circuit 8-2 receives the current feed from the transmission line L1 to generate the local power supply PWR2 and feeds this to the A/D conversion circuit 1-2, the sub CPU 2-2 and the isolation circuit 3-2. The A/D conversion circuit 1-2, which has thus received the local power supply PWR2, converts the detected signal from a temperature sensor TC2

into a digital signal and sends this digital signal to the sub CPU 2-2. The sub CPU 2-2 produces transmission data on the basis of the thus inputted digital signal.

[0013]-

On the other hand, the main CPU 4' sends the oscillation selecting signal S2 to the data selector 9, too. The data selector 9, which has thus received said oscillation selecting signal S2, sends to the sub CPU 2-2 the request for return sent over through the line L3 from the main CPU 4' to the sub CPU 2-2 through the isolation circuit 3-2. In response to the return request from the main CPU 4', the sub CPU 2-2 sends the transmission data to the main CPU 4' via the isolation circuit 3-2 and the data selector 9 through a line L4. The main CPU 4' drives the driver circuit 5 to send to the host device the transmission data thus received from the sub CPU 2-2, as a change in the current I flowing through the transmission Line L2.

[0014]

In the like manner, from then on, the main CPU 4' successively sends the oscillation selecting signals S3 and S4 to the local power supply generation circuits 8-3 and 8-4 to actuate said local power supply generation circuits 8-3 and 8-4 successively by switching, whereby the

successively generated local power supplies PWR3 and PWR4 are fed to the A/D conversion circuits 1-3 and 1-4, sub CPUs 2-3 and 2-4, and the isolation circuits 3-3 and 3-4 and successively sends, as a change of the current I flowing through the transmission line L2, the transmission data from the sub CPU 2-3 and 2-4 to the host device; and, after sending the transmission data from the sub CPU 2-4 to the host device, the main CPU 4' sends the oscillation selecting signal S1 to the local power supply generation circuit 8-1, thus repeating the above-mentioned operation.

[0015]

As is apparent from the description given above, in the two-wire multiple input transmitter 100' according to this embodiment, the main power supply PWR_M which is constantly generated and the local power supplies PWR1 to PWR4 which are generated successively by switching are used, so that, as the operating power of the transmitter, the same current of 4 mA as that in the case of the one-point input can sufficiently serve the purpose, and thus, the necessity of using a large-capacity power supply in the host device is eliminated. Further, according to this embodiment, only one two-wire transmission line L1, L2 is laid down between the transmitter and the host device, whereby the data measured at four points can be sent to the

host device; and thus, there is eliminated the occurrence of the problem that the construction costs would otherwise be raised due to the increase in number of the cables laid down and the increase in number of the construction steps, so that the invention is very economical.

[0016]

In the above-described embodiment of the present invention, TC1 to TC4 are provided as temperature sensors, but humidity sensors or the like may instead be connected. Further, in the case of this embodiment, if the temperature sensors TC1 to TC4 are formed of temperature measuring resistors, then current must be fed to the temperature measuring resistors, so that some rise time must be spent at the time of measurement, but this inconvenience can be overcome by lengthening the switching period of the oscillation selecting signals S1 to S4. In case the temperature sensors TC1 to TC4 are constituted of thermocouples, the detected signal can be obtained as an electromotive force promptly, so that the switching period of the oscillation selecting signals S1 to S4 may be shortened.

[0017]

(Effect of the Invention)

As may be apparent from the foregoing description,

according to the present invention, the main power supply which is constantly generated and the local power supplies which are generated successively by switching are used, so that the operating power used can be the same power as that in the case of one-point input, and thus, the provision of a large-capacity power supply in the host device is not needed. Further, by providing only one two-wire transmission line between the transmitter and the host device, the data measured at multiple points can be sent to the host device, and thus, there is not caused the problem that the construction costs would otherwise be increased due to the increase in number of the cables laid down and the increase in number of the construction steps; and accordingly, the present invention turns out to be very economical.

[Brief Description of the Drawings]

Fig. 1 is a block circuit diagram showing the constitution of the two-wire multiple input transmitter according to an embodiment of the present invention.

Fig. 2 is a block circuit diagram showing the constitution of a conventional two-wire transmitter.

(Explanation of Reference Numerals and Symbols)

1-1 to 1-4 .. A/D conversion circuits.
2-1 to 2-4 .. Sub CPUs.
3-1 to 3-4 .. Isolation circuits.
4' .. Main CPU.
5 .. Driver circuit.
7 .. Main power supply generation circuit.
8-1 to 8-4 .. Local power supply generation circuits.
9 .. Data selector
TC1 to TC4 .. Temperature sensors.
L1,L2 .. Transmission line.
100' .. Two-wire multiple input transmitter.
1000 .. Fig. 1.
1001 .. Oscillation selecting signals.
1002 .. Serial data.

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